

**CLAIM**

- 1 1. A switching network comprising:
- 2 a) a first stage of switches having input lines and output lines and comprising
- 3 m (n x k) switches, wherein m is an integer number, n is an integer number
- 4 representing the number of input lines and k is an integer number representing the
- 5 number of output lines
- 6 b) a second stage of switches comprising of m (k' x k') switches, k' is an integer
- 7 number representing the number of inputs and outputs
- 8 c) a third stage of switches comprising of m (k x n) switches
- 9 wherein k' is selected such that  $m \cdot Q(k'/m) \geq k$  (where  $Q(x/y)$  denotes the quotient of
- 10 dividing x by y) to allow using m switches in the second stage.

- 1 2. A switching network comprising:
- 2 m identical modules, said module further comprising
- 3 a) an input stage comprising of a (n x k) switch wherein n is an integer number
- 4 representing the number of input lines and k is an integer number representing
- 5 the number of output lines
- 6 b) a middle stage comprising of a (k' x k') switch, k' is an integer number
- 7 representing the number of inputs and outputs
- 8 c) an output stage comprising of a (k x n) switch
- 9 wherein k, k', and m satisfy  $m \cdot Q(k'/m) \geq k$

- 1 3. A method of constructing a switching network comprising:
- 2 a) using m identical modules,
- 3 b) constructing said module from an input stage comprising of a (n x k) switch, a
- 4 middle stage comprising of a (k' x k') switch, an output stage comprising of a
- 5 (k x n) switch
- 6 c) selecting k' such that  $m \cdot Q(k'/m) \geq k$

- 1 4. A module comprising:

- 2 a) an input stage comprising of a  $(n \times k)$  switch, switch wherein  $n$  is an integer  
 3 number representing the number of input lines and  $k$  is an integer number  
 4 representing the number of output lines  
 5 b) a middle stage comprising of a  $(k' \times k')$  switch,  $k'$  is an integer number  
 6 representing the number of inputs and outputs  
 7 c) an output stage comprising of a  $(k \times n)$  switch  
 8 wherein a switching network can be constructed using  $m$  of said modules, where  $k$ ,  $k'$ , and  $m$   
 9 satisfy  $m \cdot Q(k'/m) \geq k$

- 1 5. A method of constructing a  $v(k, n, m)$  switching network for values of  $m$  belonging to a  
 2 non-empty set  $\mathcal{M}$  comprising:  
 3 a) using  $m$  identical modules,  
 4 b) constructing said module from an input stage comprising of a  $(n \times k)$  switch, a  
 5 middle stage comprising of a  $(k' \times k')$  switch, an output stage comprising of a  
 6  $(k \times n)$  switch  
 7 c) selecting  $k'$  such that  $m \cdot Q(k'/m) \geq k$  for all values of  $m$  belonging to set  $\mathcal{M}$